Computer Networks-II

Semester VI **Subject Code: BS61703** **Lectures: 60**

Objectives:

The syllabus aims in equipping students with,

- To Understand wireless networks, its types and functionality of layer.
- To learn different types of addresses
- To Understand importance of network security and cryptography

Unit 1 : Wireless LANs 4

- IEEE 802.11 Architecture – Basic Service Set, Extended Service Set,Station Types and overview of layers
- Bluetooth Architecture – Piconet, scatternet and overview of Bluetooth layers

Unit 2: Network layer 16

2.1 The Network Layer

- Design Issues
  - Store-and-forward packet switching,
  - Services Provided to the Transport Layer
  - Comparison of Virtual Circuit and Datagram subnets
- Logical Addressing IPV4 Addresses :Address Space, Notations , Classful Addressing,Subnetting, Supernetting, Classless Addressing and Network Address Translation(NAT),
- IPv6 Addresses
- IPV4 Protocol: Datagram Format, Fragmentation, Checksum and Options
- Routing: Properties of routing algorithm, Comparison of Adaptive and Non- Adaptive Routing Algorithms
- Congestion Control :Definition, Factors of Congestion, Difference between congestion control and flow control, General Principles of Congestion Control and Congestion Prevention Policies
- Network Layer Devices :Routers and Routing Tables

2.2 Address Mapping

- Protocol(ARP)-Cache Memory, Packet Format, Encapsulation, Operation, Four Different Cases and Proxy ARP
- RARP
- BOOTP
- DHCP – Static Address Allocation, Dynamic Address Allocation, Manual and automatic Configuration

Unit 3: Transport layer 6

- Process-to-Process Delivery Client Server Paradigm, Multiplexing and De-multiplexing, Connectionless Vs Connection-Oriented Service, Reliable Vs Unreliable
- User Datagram Protocol(UDP)
  - Datagram Format
  - Checksum
  - UDP operations
  - Use of UDP
- Transmission Control Protocol (TCP)
  - TCP Services
  - TCP Features :Numbering System(Byte Number, Sequence Number, Acknowledgement Number) ,Flow Control,Error Control and Congestion Control
  - TCP Segment – Format

Unit 4: Application Layer 10

- Domain Name System (DNS)
  - Name Space
  - Domain
  - Name Space,
- Distribution of Name Space,
- DNS in the Internet
- Resolution
- E-MAIL Architecture,
  - User Agent
  - Message Transfer Agent-SMTP
  - Message Access Agent-POP3, IMAP4
- File Transfer Protocol (FTP)
  - FTP components and connection
  - Anonymous FTP
- WWW Architecture, WEB Documents
- HTTP
  - HTTP Transaction
  - Persistent and Non persistent Connection
  - Proxy Server
- Devices
  - Gateways –Transport & Application Gateways

Unit 5: Network Security 12

- Security Goal
  - Cryptographic attacks and terminology
- Security Services
  - Message-Confidentiality
  - Integrity
  - Non repudiation
  - Entity (User)- Authentication,
  - Message authentication
  - Digital signature.
- Message confidentiality
  - Confidentiality with Asymmetric-Key Cryptography,
  - Confidentiality with Symmetric-Key Cryptography
- Cryptography Encryption Model
  - Substitution Cipher
  - Transposition Cipher
  - RSA algorithm
- Security in the Internet
  - VPN
  - Firewalls
  - Protocols (Overview of IPSec,SSL/TLS)

***Contact hours – 12 hours**

Reference Books:

1. Andrew Tanenbaum ,'Computer Networks', Pearson Education.[4th Edition]
2. Behrouz Forouzan ,'Data Communication and Networking', TATA McGraw Hill. .[4th Edition]